

HOW I DO IT

Spleen- and Pancreas-Preserving Total Gastrectomy With Superextended Lymphadenectomy Including Dissection of the Para-aortic Lymph Nodes for Gastric Cancer

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INTRODUCTION

To improve the survival of patients with advanced gastric cancer, it is necessary to do not only a superextended lymphadenectomy (D4) but also adjuvant therapy such as immunotherapy [1,2]. Total gastrectomy with distal pancreaticosplenectomy has been widely performed for advanced proximal gastric cancer. The spleen is immunologically active in stage III disease, but not in stage IV [3,4]. Therefore, in stage III, spleen preservation is a reasonable means of enhancing postoperative immunotherapy. In order to improve the survival of patients with stage III proximal gastric cancer, we performed spleen and pancreas-preserving total gastrectomy with superextended lymphadenectomy, including dissection of the para-aortic lymph nodes, as follows.

SURGICAL TECHNIQUE

The lymph node numbering and the degree of lymphadenectomy were based on the Japanese Classification of Gastric Carcinoma [2]. Para-aortic lymph nodes are classified as no. 16. lymph nodes and divided into four subgroups as follows: no. 16a1: lymph nodes in the aortic hiatus, no. 16a2: lymph nodes around the abdominal aorta (from the upper margin of the celiac trunk to the lower margin of the left renal vein), no. 16b1: from the lower margin of the left renal vein to the upper margin of the inferior mesenteric artery, and no. 16b2: from the upper margin of the inferior mesenteric artery to the aortic bifurcation. Lymph nodes 10 and 11 are nodes at the splenic hilum and along the splenic artery, respectively.

First, the duodenum, ascending colon, and cecum are mobilized. A good operative field is thus obtained for

dissection of the para-aortic lymph nodes from the lower margin of the left renal vein to the aortic bifurcation (nos. 16b1 and b2). The inferior vena cava, abdominal aorta, left renal vein, right renal artery, inferior mesenteric artery, testicular or ovarian vein, and lumbar vessels are exposed and isolated along a length of vessel tapes (Fig. 1). The lymphadenectomy including nos. 16 b1 and b2 lymph nodes is completed (Fig. 2). If uncontrollable hemorrhage occurs during this serial procedure, hemostasis can be achieved by clamping each vessel guided by the vessel tapes. The taping procedure is very important.

Total gastrectomy, including systemic lymphadenectomy of groups 1, 2, and 3 nodes, is performed. As described by Kajitani et al. [5], the entire greater omentum, superior leaf of the mesocolon, pancreatic capsule, and lesser omentum are removed en bloc. Lymphadenectomy is performed in the infra- and supraduodenal area along the proper hepatic, common hepatic arteries, the celiac axis, and retropancreatic and splenic arteries.

Next, after mobilization of the left kidney, the spleen and distal pancreas are mobilized from the left kidney and retroperitoneum. The splenic artery and vein are both identified behind the pancreatic tail and dissected from the pancreatic parenchyma. The fatty tissues, including lymph nodes along the splenic artery (no. 11), are completely removed from the splenic artery and pancreatic parenchyma. Next, at the splenic hilum, the splenic vessels are exposed and the short gastric vessels and left epigastric vessels are ligated and divided at their origins. Using an ultrasonic dissector, the fatty tissues, including

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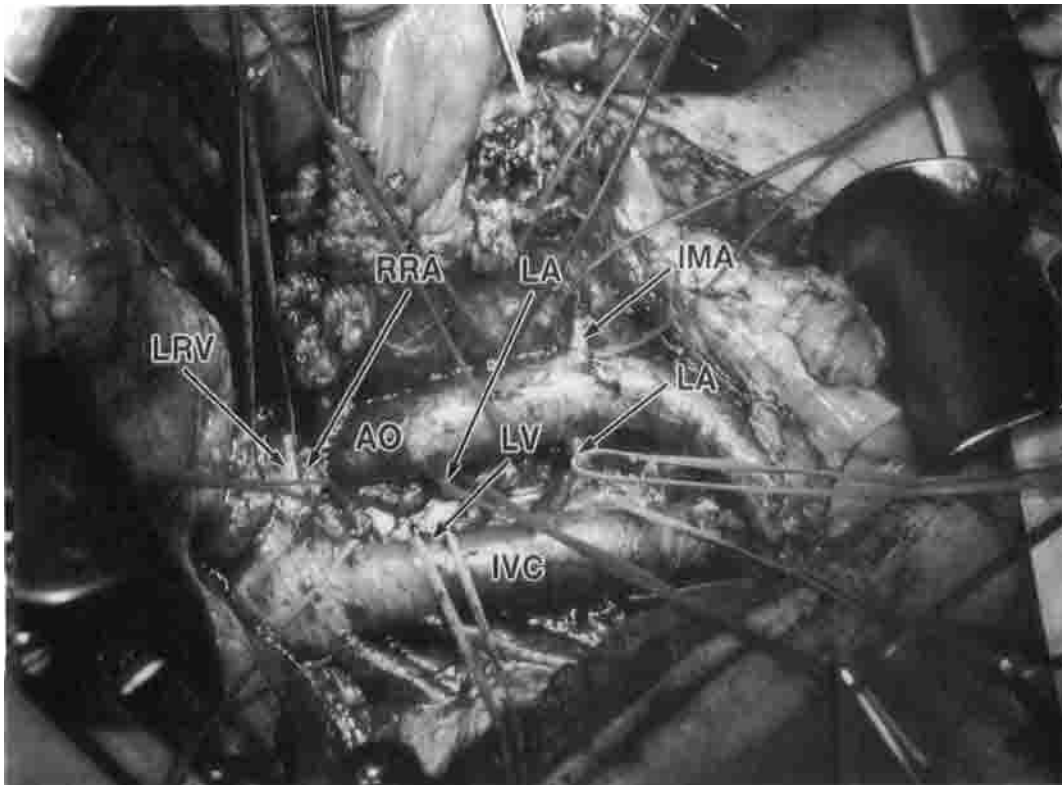


Fig. 1. For safe dissection of No. 16 b1 and b2 lymph nodes, vessels to be preserved were exposed and isolated along a length of vessel tape. AO: abdominal aorta, IVC: inferior vena cava, IMA: inferior mesenteric artery, RRA: right renal artery, LRV: left renal vein, LA: lumbar artery, LV: lumbar vein.

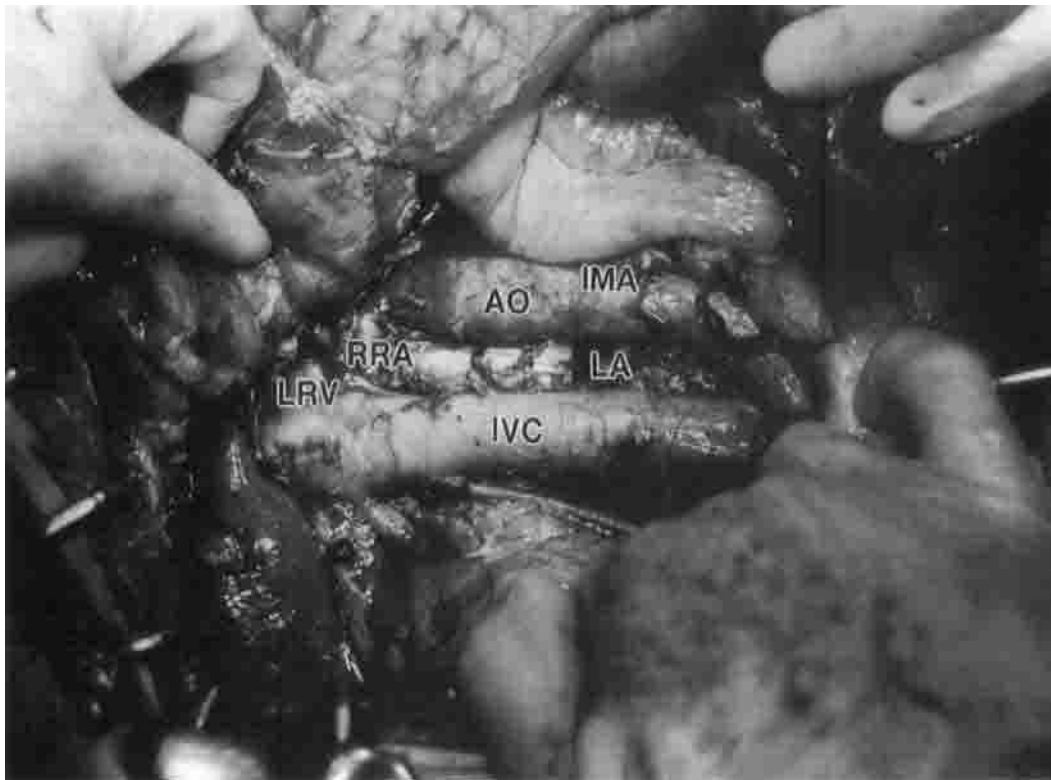


Fig. 2. The para-aortic lymph nodes from the lower margin of the left renal vein to the aortic bifurcation (No. 16b1 and b2) are completely removed. AO: abdominal aorta, IVC: inferior vena cava, IMA: inferior mesenteric artery, RRA: right renal artery, LRV: left renal vein, LA: lumbar artery.

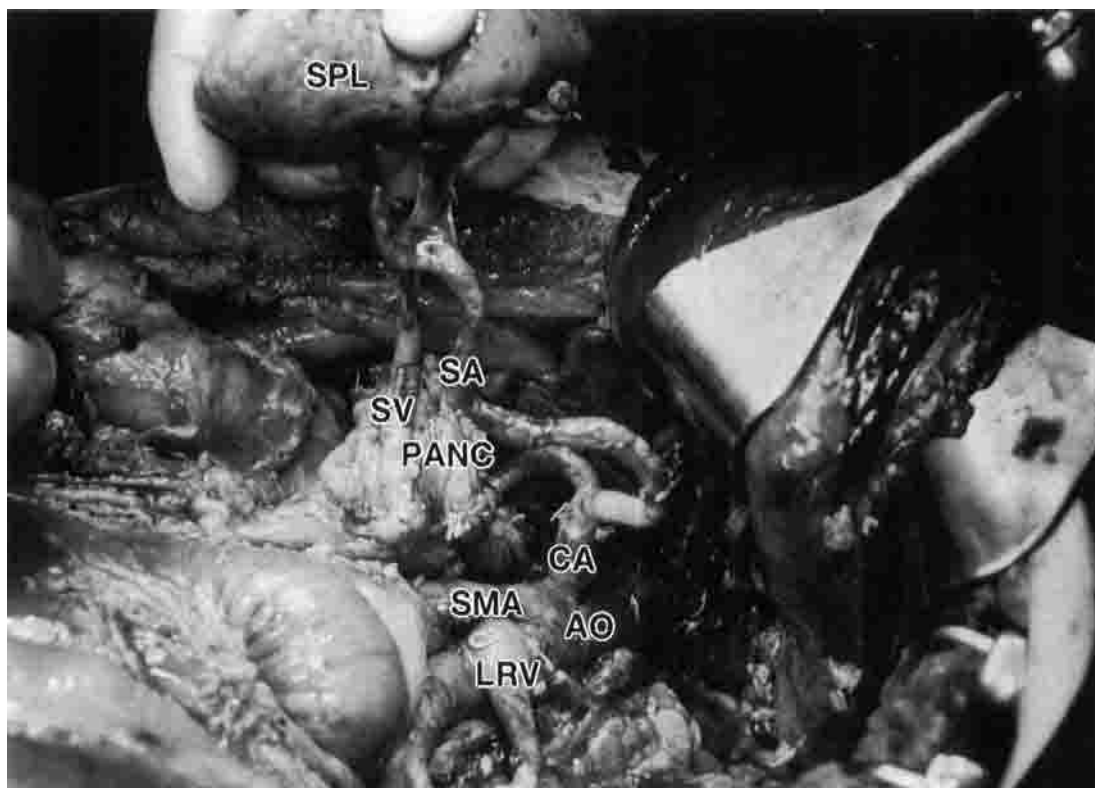


Fig. 3. The lymph nodes along the splenic artery (no. 11) and at the splenic hilum (no. 10) are completely removed. Also the para-aortic lymph nodes in the aortic hiatus (no. 16a1) and from the upper margin of the celiac trunk to the lower margin of the left renal vein (no. 16a2) were completely removed. SPL: spleen, PANC: tail and body of pancreas, AO: abdominal aorta, LRV: left renal vein, SMA: superior mesenteric artery, CA: celiac trunk, SA: splenic artery, SV: splenic vein.

lymph nodes at the splenic hilum (no. 10), are completely removed from the splenic hilum while preserving the splenic vessels. Finally, lymphadenectomy of the para-aortic lymph nodes in the aortic hiatus (no. 16a1) and from the upper margin of the celiac trunk to the lower margin of the left renal vein (no. 16a2) is performed (Fig. 3).

To assure complete removal of no. 10 lymph nodes in this operation, it is necessary that fatty tissues as well as the lymph nodes be removed completely from the splenic hilum and that all of the splenic vessels in the hilum be preserved. This procedure is technically difficult using conventional instruments. We used an ultrasonic dissector, which has proven to be very helpful.

To evaluate this operation, we performed spleen and pancreas-preserving total gastrectomy with superextended lymphadenectomy including, complete dissection of the para-aortic lymph nodes in five patients. In all, there were no postoperative complications and the postop-

erative recovery was uneventful. The median follow-up periods of the five patients was 31.2 months (range: 6–48 months). At the time of publication, all of the patients are surviving without recurrence.

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